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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE 2828 Chiles Road Davis CA 95616

October 24, 1980

Linda Peralta
Chairman, Board of Directors
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose CA 95118

Dear Ms. Peralta:

I am pleased to notify you that planning assistance has been authorized for the Lower Silver Creek Watershed. We look forward to providing your district and the Evergreen Resource Conservation District the assistance necessary to develop a final plan under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566).

Attached is a copy of the Preauthorization Report which summarizes the studies compiled by the Soil Conservation Service to the present date.

Our planning activity will continue to operate out of this office. The planning staff leader will contact Mr. John Richardson to coordinate and schedule this activity.

Sincerely,

Francis C. H. Lum
FRANCIS C. H. LUM
State Conservationist

SANTA CLARA
VALLEY WATER DISTRICT
'80 OCT 31 PM 2:36

FUTURE STUDIES

As part of the on-going scoping and plan formulation process, economic, environmental, and social factors on which further studies will be conducted are listed below.

Factors	Studies
Floodwater	Various types of channel systems from Coyote Creek to Lake Cunningham
	Downstream impacts of channel work on Coyote Creek
	Site specific floodproofing of buildings and industry in the lower watershed
	Development of a remaining flood map for the selected alternative
	Closed transportation routes and associated indirect damages
	Development of a National Economics Development alternative
Streams, Lakes, Wetland, and Wildlife	Use of "SCS Guide for Environmental Assessment and Resource Inventory Checklist" to determine impacts of each alternative
	Refinement of wetland, riparian zone, and wildlife impacted
	Development of Environmental Quality Alternative
Visual Resources	Evaluation of impacts of various alternatives

As part of the on-going studies, erosion and sedimentation, water quality, endangered and threatened plants and animals, air quality, and cultural resources of national significance will be reviewed to assure that proposed changes comply with federal, state, and local regulations.

No additional studies are planned in land use, prime agricultural land, groundwater, fisheries, irrigation, mineral resources, and recreation.

FINAL
PREAUTHORIZATION
REPORT

LOWER SILVER CREEK WATERSHED

SANTA CLARA COUNTY,
CALIFORNIA

NEO EQ

SPONSORED BY
EVERGREEN RESOURCE CONSERVATION DISTRICT
SANTA CLARA VALLEY WATER DISTRICT

PREPARED BY
USDA, SOIL CONSERVATION SERVICE
DAVIS, CALIFORNIA

AUGUST, 1980

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PREAUTHORIZATION REPORT [1/]

LOWER SILVER CREEK WATERSHED

Santa Clara County, California

INTRODUCTION

The purpose of this report is to appraise the economic feasibility, environmental acceptability, and willingness and capability of the sponsors to implement a plan to solve flooding problems in Lower Silver Creek Watershed. This document describes plan formulation, discloses expected environmental impacts and provides the basis for authorizing Federal assistance. Further refinement is needed to identify the National Economic Development (NED) and Environmental Quality (EQ) plans. However, sufficient studies have been conducted to meet the preceeding criteria. The preferred plan could change, depending upon what further studies reveal during refinement of the plans.

Local sponsors for the project are the Evergreen Resource Conservation District (ERCD) and the Santa Clara Valley Water District (SCVWD). The U.S. Department of Agriculture, Soil Conservation Service (SCS), has provided assistance to the sponsors in the development of the preauthorization plan. In addition, other Federal, State, and local agencies have provided input into the planning process.

This report was prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 USC 1001-1008) and in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq) and in accordance with provisions of the California Environmental Quality Act.

1/ All information and data, except as otherwise noted, were collected during watershed planning investigation by the Sponsors and the SCS.

AFFECTED ENVIRONMENT

Size and Location

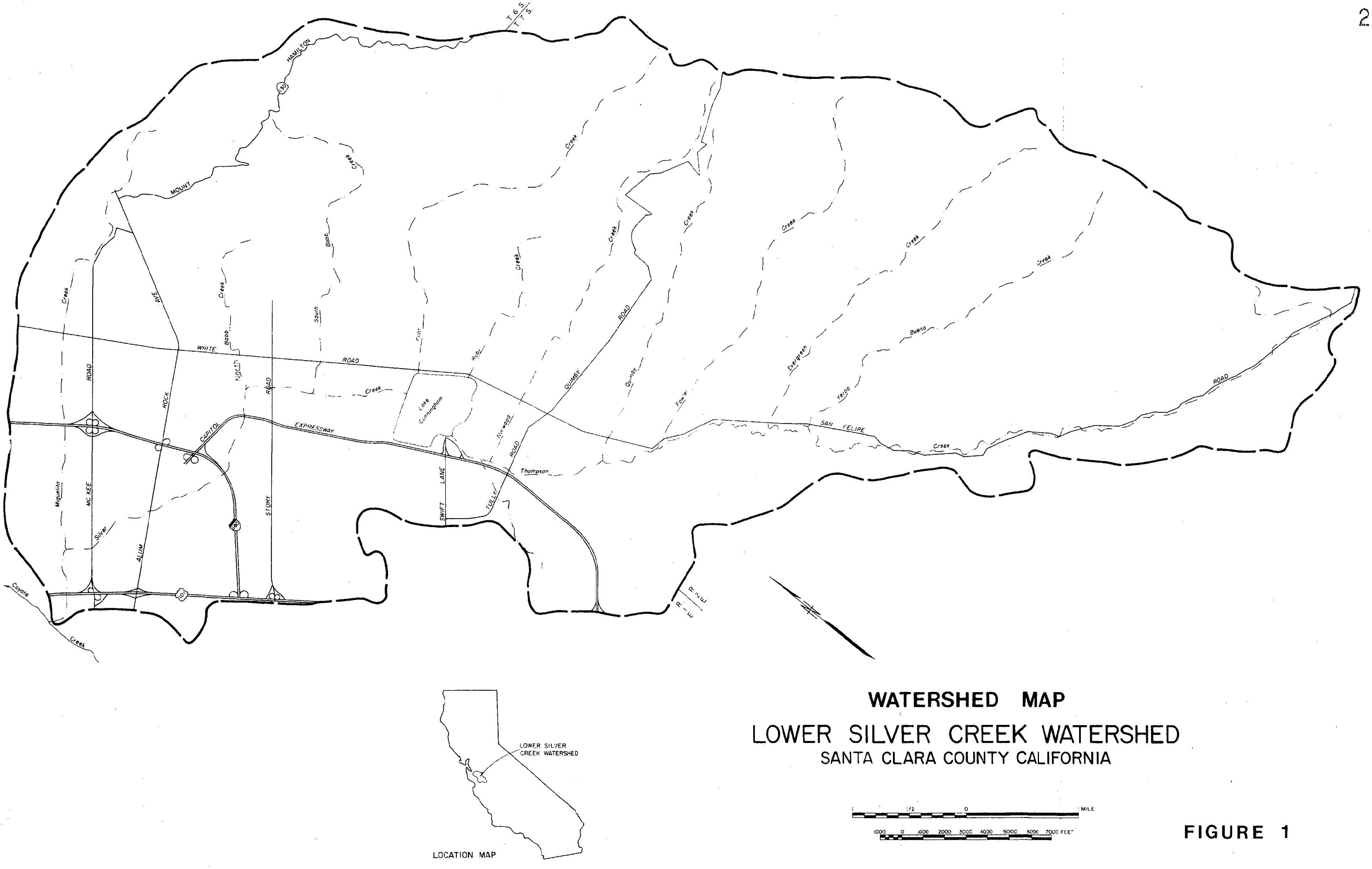
The Lower Silver Creek Watershed (Figure 1) covers an area of about 43 square miles (27,700 acres). This includes Thompson Creek, with a watershed of about 17.5 square miles (11,200 acres). Lower Silver and Thompson Creeks are located in the eastern portion of the Santa Clara Valley, partially in the City of San Jose and partially in the unincorporated area of the County of Santa Clara.

Stream System

The Lower Silver Creek watershed is about 5 miles wide at its downstream end, and slowly narrows to a width of about one mile at its upstream end. The average width of the 12-mile long watershed is about 4 miles. Upper regions of the watershed are located in steep foothills, while the lower regions are nearly flat. The watershed area includes the watersheds of many tributary creeks. The largest tributary is Thompson Creek with other tributaries being Miguelita, North Babb, South Babb, Flint and Ruby Creeks. Thompson Creek's tributary streams are Quimby, Fowler, Evergreen and Yerba Buena Creeks. Lower Silver Creek and the lower portion of Thompson Creek have intermittent flows due to the releases from the Evergreen Canal. All other streams are ephemeral and flow only during periods of surface runoff.

Climatological Data

The climatic regime of Santa Clara County is one of moderate temperatures and light to moderate precipitation. Extreme temperatures range from about 20° F - 110° F. Average lows in winter are in the middle 30's, and average highs in summer are in the 80's. Temperatures of 32° F or lower are experienced in most years, with the growing season being

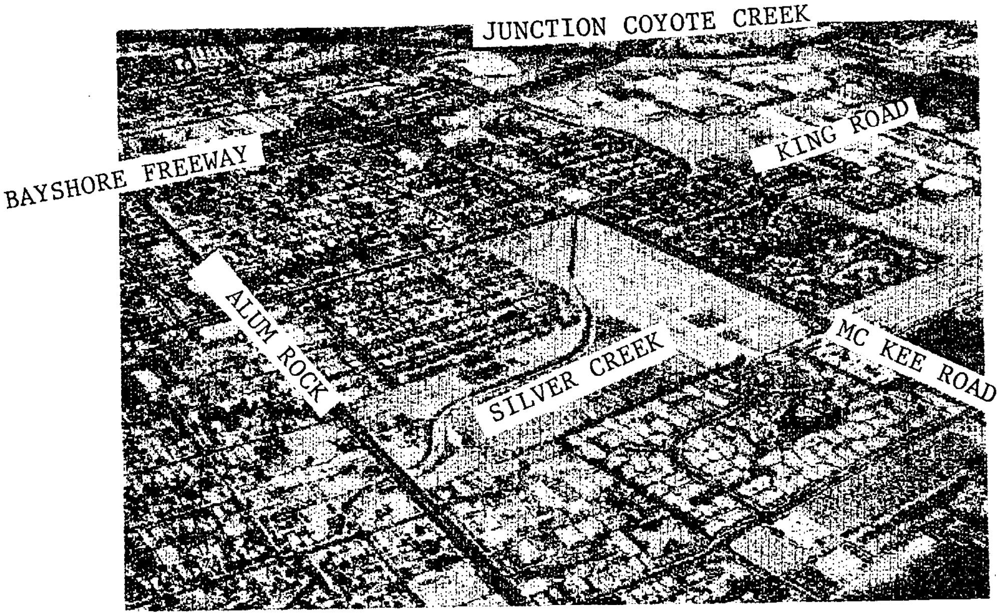


WATERSHED MAP

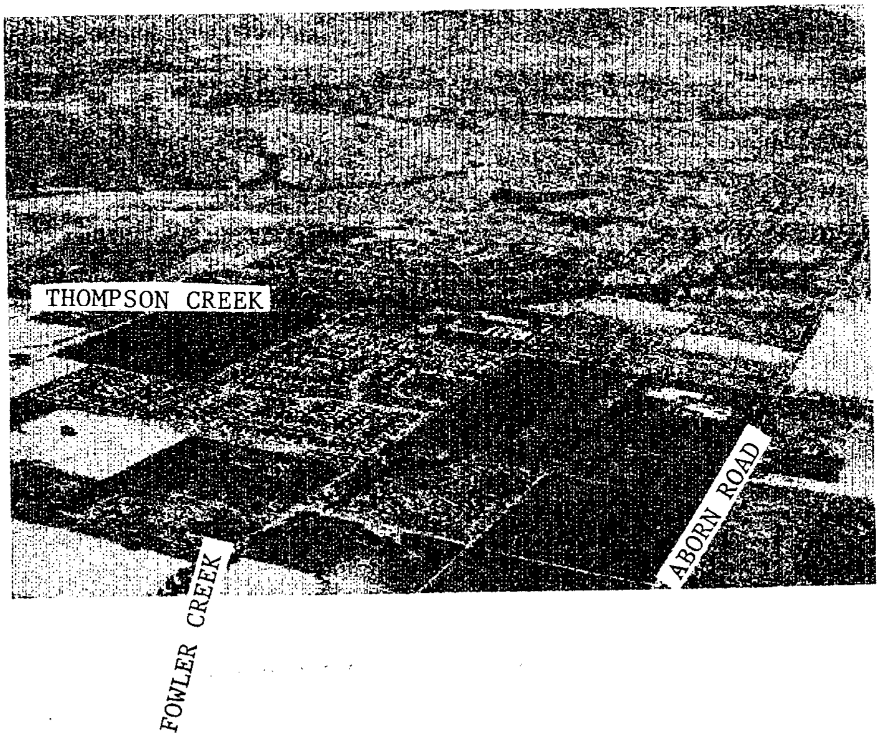
LOWER SILVER CREEK WATERSHED

SANTA CLARA COUNTY CALIFORNIA

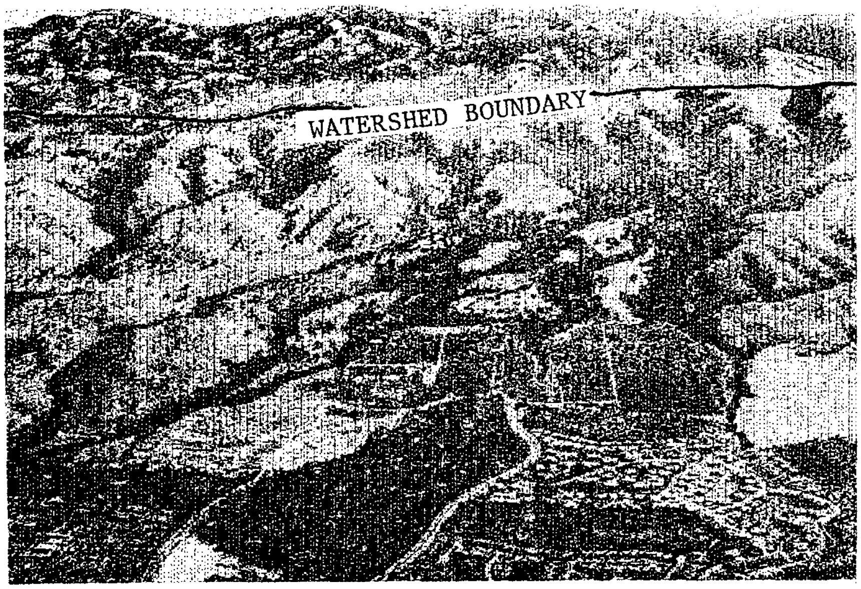
FIGURE 1



Lower Watershed Area. Photo taken July, 1979



Lower Thompson Creek Area. Photo taken July, 1979



Upper Watershed Area. Photo taken July, 1979

Quimby Creek Watershed. Photo taken March, 1979 about 336 days. Precipitation averages 14 inches in Santa Clara Valley with up to 18 inches on the eastern, mountainous areas of the watershed.

Geology

The Bedrock in the hills within the upper watershed area consists primarily of sandstones, shales and conglomerates of the Knoxville, Berryessa, Monterey and Briones Formations. These are principally folded sedimentary units of Jurassic, Tertiary and Cretaceous age. The oldest rocks are the Franciscans Formation in the southeastern corner of the upper watershed. Numerous landslides have occurred in the hills as documented by Nilsen, 1972. [1/]

Lake Cunningham is located on alluvial fan deposits of the lower watershed. These deposits have formed from sediment eroded from the foothills through Quaternary time over the last 3 million years. The materials of which these deposits are composed range in size from boulders down to clay size particles. The coarser material is deposited near the base of the foothills during intensive runoff. The Lake Cunningham basin is a natural depression which has collected sediment composed of fine grained, cohesive silty clays with some interspersed sandy silt layers.

Seismic Setting

The San Francisco Bay Area has a long history of seismic activity and related earth movements. The Hayward, Quimby, Evergreen, Aguague, Clayton, Crosley, and Silver Creek faults pass through the proposed watershed, while the Calaveras and San Andreas Faults are located nearby. Known historically active faults are the Hayward, Crosley, Calaveras, and San Andreas faults.

[1/] "Preliminary Photointerpretation of Landslides and other Surficial Deposits of Mt. Hamilton Quadrangel and parts of the Mt. Boardman and San Jose Quadrangle, Alameda and Santa Clara Counties, USGS Miscellaneous Field Studies Map No. 339, Thor Nilsen, 1972.

Measurements of accumulated strains across major Bay Area faults (San Andreas, Hayward and Calaveras) indicate that earthquakes will occur in the future. Severe earthquakes can be expected to occur every 50 to 100 years. The maximum forces may be comparable to those experienced in the San Francisco earthquake of 1906.

Soils

The soils which have developed in the basin, and the foothills on the alluvial fans, fall into three different soils groups. Soils in the basin are composed of very deep, level, and poorly drained silty clay soils of the Sunnyvale, Castro, and Clear Lake association. The soils on the alluvial fans are predominately the moderately well drained loam and clay loam soils of the Hillgate-Positas association, which are well drained but have slowly draining subsoils. Soils in the upper watershed foothills consist of residual soils weathered from rock. Of these soils, the Altamont-Azule association consists of moderate well-drained clay loam. The Los Gatos-Gaviota-Vallecitos association soils consist of well-drained loams.

Groundwater

Unconsolidated alluvial sediments which underlie the floor of Santa Clara Valley, form one of the largest and most significant groundwater basins of California. The principal water-bearing units consist of alluvial fans, basin deposits, and the Santa Clara Formation (where it underlies the younger deposits). The maximum thickness of the alluvial sediments is in excess of 1,500 feet.

Impervious clay layers which lie within the pervious layers of sand and gravel divide the basin into confined and unconfined acquifers. The unconfined groundwater zone is recharged by infiltrations of water from the surface and from lateral and vertical percolation from the perched zone.

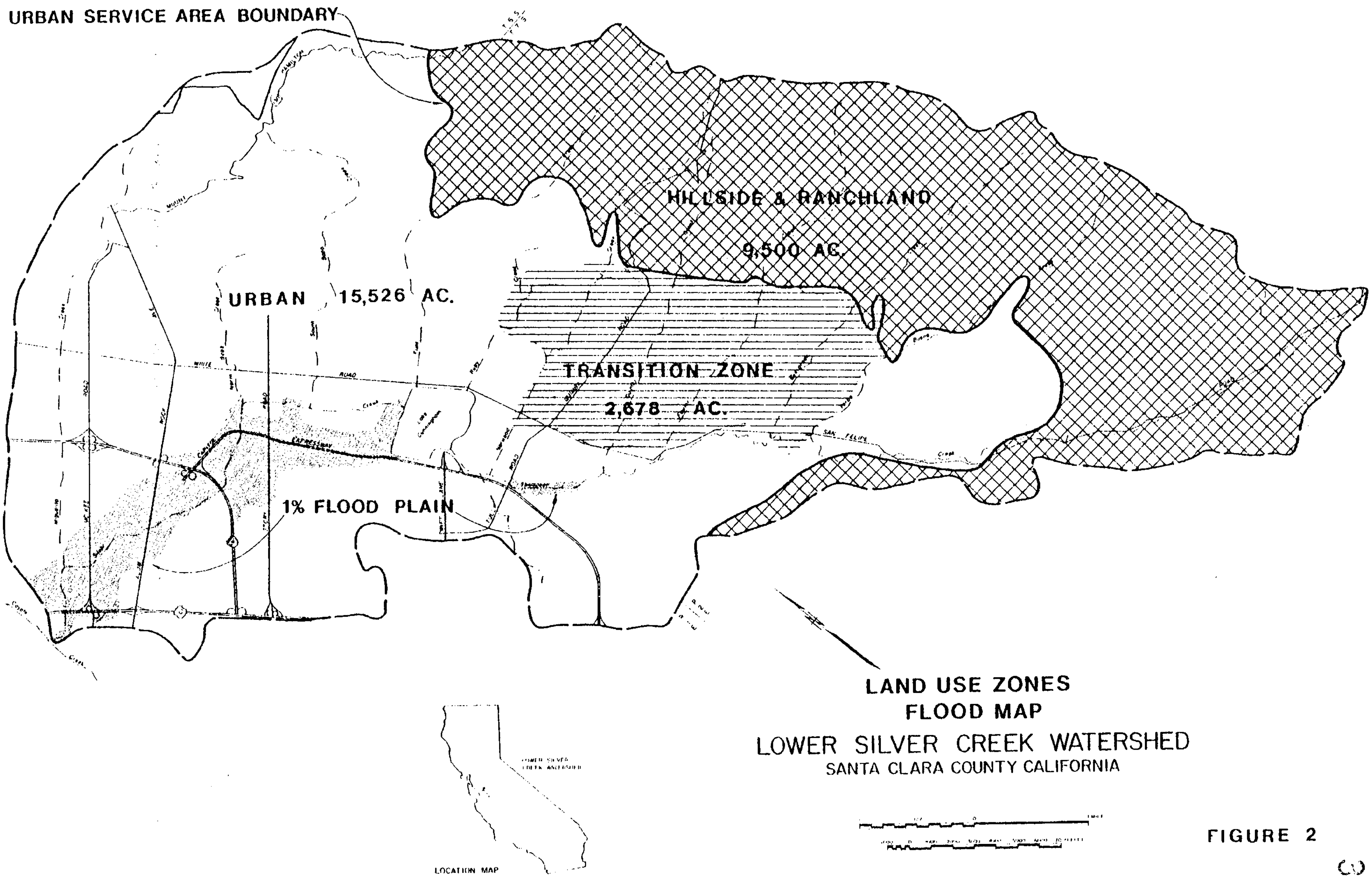
The confined groundwater zone which occurs beneath an extensive, nearly impermeable clay layer, is under significant pressure. The depth to the top of the confining clay layer has not been precisely delineated, but it may be around 200 feet. This confined zone constitutes the main groundwater zone from which most of the water is pumped in the area. It is recharged from the unconfined "forebay" area around the edges of the valley where the confining clay layer(s) pinch(es) out. "Heavy extraction of water from the basin caused an accumulated overdraft of about 685,000 acre-feet up to 1967. The current groundwater management program appears to be effectively controlling the historical overdraft problem." 1/

The overdrafting of water from the aquifer system in the Santa Clara Valley Groundwater Basin has resulted in local land subsidence totaling over 12 feet. This has occurred for the last 60 years or more. Although subsidence had nearly stopped in 1970, it ranged from 0.08 to 0.55 feet between 1960 and 1970. Subsidence has been controlled today as a result of the Santa Clara County Flood Control and Water District's recharge program. Subsidence might commence again, however, if the amount of water needed for recharge is not available, recharge capacity is modified, or if pumping rates exceed the level needed to prevent large drawdowns.

Land Use

Much of the western half of the watershed is within the corporate limits of San Jose and is intensively urbanized (Figure 2). This area comprises 15,526 acres or 56 percent of the watershed and contains a mix of land uses including residential, apartments, commercial, industrial and parks.

1/ USR Research Company, "Environmental Impact Report on the Santa Clara County Flood Control and Water District, East Flood Control Zone Project".



LAND USE ZONES
FLOOD MAP
LOWER SILVER CREEK WATERSHED
SANTA CLARA COUNTY CALIFORNIA

FIGURE 2

300

The largest single urban land use is single family residential covering 5,300 acres of the urban service area in 1976. The land use trends in this area are: development of open parcels within the existing urban area, and urban development of steeper sloping land adjacent to the existing urban area.

The upland area on the eastern and southern fringes of the watershed is presently rangeland. This area (referred to as hillside and ranchland) comprises 9,500 acres and its dominant characteristics are its steep slopes and its inaccessibility (Figure 2). Wooded and riparian areas are interspersed within the urban reserve area. There are relatively few residences or roads presently in the area. There are minor land conversions occuring in this area, but future projections indicate that residential development will occur.

The third major region in the watershed is referred to as the transition zone (Figure 2). This area is southeast of the urban area and below hillside and ranchland area. It is an area with gentle slopes which in the past had been crop and orchard land, and is rapidly being converted to urban areas. The area of the transition zone contains 2,678 acres. In 1976 there were 312 acres urban and 2,366 acres of agricultural land. Of this, 1,530 acres were orchards or vineyards. In 1980, the acreages are 896 urban, 1,782 agriculture and of this 1,216 acres are in orchards and vineyards. The transition zone is undergoing rapid residential development. Between 1976 and 1980, 22 percent of the area was converted to residential land use.

Economy of the Area

The Lower Silver Creek Watershed is located within the San Jose metropolitan area. The economy of the San Jose area, although diversified, is heavily dependent on the manufacturing industry which employs nearly 35 percent of all wage and salary workers in the area. Production of durable goods, particularly electronic components, parts, and equipment accounts for 50 percent of the jobs in the manufacturing industry. The service industries and the retail and trade industries account for an additional 30 percent and 20 percent respectively of all wage and salary workers. Agriculture employs less than 2 percent of the total San Jose work force. This low level of agricultural related employment reflects the small amount of open land that is actively being farmed in the area. Common crops in the watershed include: grain, truck crops, grapes and other fruits. Total unemployment in the area has averaged about 5 percent over the past 3 years, with minority unemployment averaging 8 percent for blacks and 10 percent for Spanish-speaking residents. During the last decade, the total employment growth in both Santa Clara County and the immediate San Jose area has more than matched the increase in population.

Per capita Income for the entire county is estimated to be $9,771 in 1980.

Population Centers

Since its emergence as an industrial community in the early 1950's, the San Jose Standard Metropolitan Statistical Area (SMSA) has experienced extraordinary population growth. From 1950 to 1970 the total population has increased from 290,500 to 1,101,000 which translates into an average annual growth rate of nearly 7 percent. Although total population growth within the SMSA is expected to continue in the future, present trends indicate that it will be at a diminishing rate.

The population in the watershed study area has exhibited the same relative degree of growth as has been experienced in the SMSA, except that the rate of growth has been more pronounced during the last 10 years and will most likely continue to occur for the next 10 years. This reflects the continued outward expansion of the suburbs. Population within the watershed was estimated at 175,000 in 1975. Minorities constitute 20 percent of the total watershed population.

Watershed lands are either under the jurisdiction of the City of San Jose or Santa Clara County. Currently, approximately one-third of the watershed's population are residents of the city. This percentage is expected to increase as the city continues to expand, through annexation, into the unincorporated county lands.

Biological Resources

Past agricultural and urban developments have altered or removed most wildlife and fish habitat within the western portion of the watershed. The remaining habitat is restricted to riparian communities along the creeks. The riparian community along Lower Silver Creek, between its confluences with Coyote Creek and Thompson Creek, has been altered and greatly reduced due to urbanization and channelization of the creek. Portions of Lower Silver Creek have been concrete-lined and support cattails, sedges, and other hydrophytic herbaceous plants in the accumulated sediments. The sparse riparian plant community along Lower Silver Creek consists of saplings of Fremont cottonwood, western sycamore, big leaf maple, California box elder, coast live oak and willow.

The eastern portion of the watershed is partially developed, however, an extensive oak-grasslands community still exists in the foothill region. Various intermittent streams flowing out of the upper watershed into Lower Silver Creek support more extensive riparian communities that provide habitat for a variety of wildlife species. Thompson Creek supports a diversified multi-layered riparian community made up of many significantly sized trees with both a woody and herbaceous understory.

Wetlands: Historic wetlands have been drained or altered throughout the watershed due to previous urban and agricultural pressures. Type 3 wetlands (USFWS Circular 39) occur along the channel bottoms of Lower Silver Creek and Thompson Creek near their confluence. Small portions of the riparian community along Thompson Creek and Lower Silver Creek near its confluence with Coyote Creek, meet the criteria of Type 6 wetlands. Lake Cunningham totals approximately 50 acres of Type 5 wetland. Generally, Type 1 and 2 wetlands would be found associated with these other wetland types, however past urbanization has completely eliminated these types. Total wetlands in the watershed are less than 55 acres.

Wildlife: The riparian woodlands along Thompson Creek and other tributaries to Lower Silver Creek support a large diversity of resident, wintering and migratory birds. The foothill oak-grasslands also support several species of birds as well as a variety of wintering raptors, including golden eagles.

Several species of mammals such as gray fox, raccoon, opossum, black-tailed deer, striped skunk, norway rats and black rats are found in both the oak-grassland community and along the riparian corridors.

Creeks within the watershed support populations of bullfrogs and Pacific treefrogs. California slender salamanders can be found in the riparian communities in the upper watershed.

Several species of reptiles can also be found within the watershed. Some of the more common species are California king snake, gopher snake, rattlesnake, western fence lizard and the western skink.

Aquatic: Lower Silver Creek is intermittent and supports small populations of sticklebacks, bluegill, carp, and mosquitofish. The lower portion of Thompson Creek is intermittent due to releases from Evergreen Canal by the SCVWD. Decreased irrigation needs along Thompson Creek may result in the eventual discontinuance of summer water and revert Thompson Creek to an ephemeral stream. The tributaries to Lower Silver Creek and Thompson Creek are ephemeral and probably do not contain fish. Recreational development plans for Lake Cunningham include the establishment of warm water fisheries. The lake will provide habitat for several wildlife species including waterfowl and shorebirds.

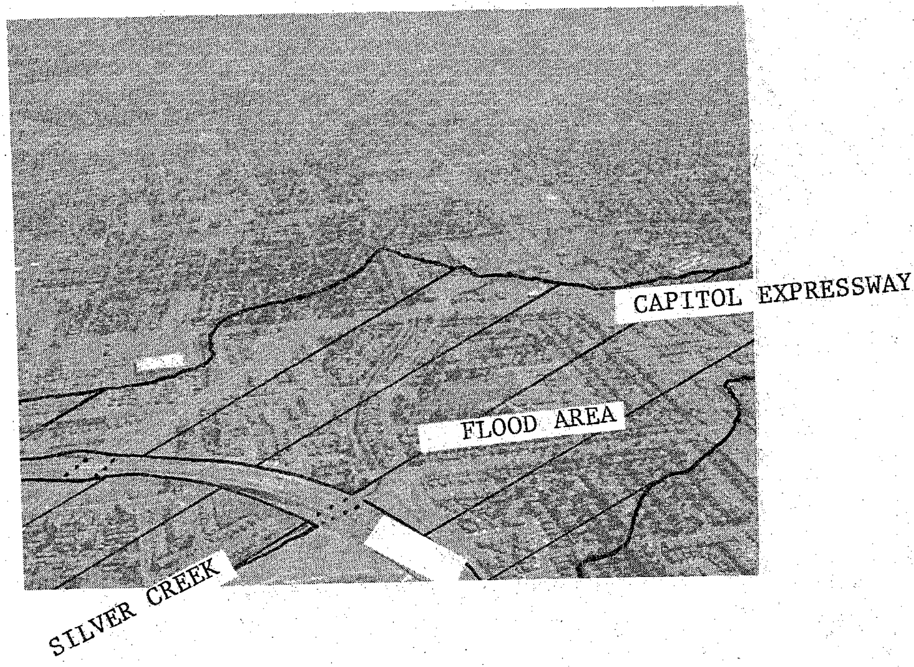
Endangered Species: The United States Fish and Wildlife Service (USFWS) was contacted regarding any listed or proposed endangered or threatened species within the watershed. The San Joaquin Kit Fox is a listed species that may exist in the area. Two species of plants, Mt. Hamilton Thistle and Contra Baeria, which might occur in the watershed are under review by the USFWS for consideration to list as endangered or threatened species.

Lower Silver Creek is a tributary to Coyote Creek which empties into San Francisco Bay. At the confluence of Coyote Creek and San Francisco Bay is a salt water marsh which provides habitat for the salt marsh harvest mouse and the California clapper rail. Both of these species are listed as endangered species. The USFWS has expressed concern about the possible indirect and/or direct effects that any altered downstream flow regimes may have upon these listed species.

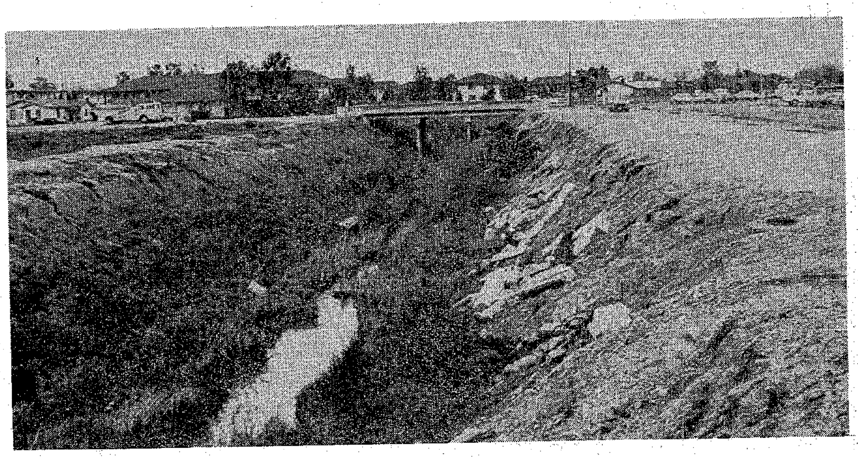
Watershed Problems

The Watershed problems in Lower Silver Creek are those normally associated with an area rapidly changing from agriculture to urban. The primary problems include: flooding, erosion, sedimentation, groundwater, and wildlife loses.

Flooding: In its former natural setting of gentle slopes and poorly drained soils, Lower Silver Creek flowed in an ill-defined channel often overflowing the flatter swamp like areas. In the early 1950's, Lower Silver Creek was placed in a defined man-made channel and diverted to its present alignment between Lake Cunningham and what is now North Babb Creek. This diversion was made by farmers in the area so that they could reclaim the swampy area in the Lake Cunningham region and upstream valley for agricultural purposes. During the same time period, developers began purchasing agricultural land in the lower watershed and converting it to a residential community thereby creating a large potential for



Approximate Flood Area. One Percent Event.



Lower Silver Creek Channel Erosion. Photo taken March, 1979 loss due to floods. The floods of 1952, 1955, 1958 and 1967 caused damage to existing houses and businesses. Based upon 1980 land use, approximately 4,400 buildings are located in the flood prone area. It is estimated that 1,700 buildings are likely to experience varying degrees of damage due to interior flooding. Major transportation routes including Bayshore Freeway (101), Capitol Expressway, Story Road, Alum Rock Road and others will be flooded when the storms exceed the 10 percent event.

Historically, the area between Cunningham Avenue and Quimby Road easterly of Capitol Expressway, has acted as a natural basin for overland waters and thus was inundated many times. This low lying area is presently being developed as a regional park (Lake Cunningham), which also serves as a storage basin for 380 acre-feet of floodwater on Lower Silver Creek.

Erosion: Soils in the upper portions of the watershed are moderately to highly erodible. The estimated sheet and rill erosion rates average 1.1 tons per acre per year on slopes less than 25 percent, 2.6 tons on 25 to 50 percent slopes, and 5.6 tons on slopes greater than 50 percent. Rates from 0.1 to 9.3 tons per acre per year occur. The vegetative cover (oak-grassland) is in generally good condition so the erosion is primarily natural, or geologic erosion. Any deterioration in the cover could cause severe erosion and downstream sedimentation problems.

A few small gullies exist, primarily at outlets of road culverts and crossings. These gullies contribute only 40 tons per year to the gross erosion in the Lower Silver Creek Watershed.

Approximately 685 tons of erosion per year are contributed from road bank erosion along San Felipe Road from the eastern boundary of the watershed to Cadwallader Avenue.

Old landslides in the upper, sloping portions of the watershed have stabilized, and if left undisturbed during development, contribute little erosion.

In the lower watershed, subdivision development construction areas have potential for 50 tons plus per acre per year erosion rates. After the developed areas are stabilized, erosion rates are much lower than rates from agricultural areas.

Sedimentation: About 25,000 tons of sediment are delivered to Coyote Creek in an average year by Lower Silver Creek. Almost all of the homes and businesses that receive floodwater damage are also damaged by clay and silt deposits remaining after the floodwaters recede.

Some sediment carried by storm runoff is trapped in Lake Cunningham. Approximately 2,000 tons (1.7 acre-feet) of sediment are trapped in the lake in an average year. For a large storm, such as the 50-year (2 percent event), 18,000 tons (12.5 acre-feet) of sediment could be deposited in the lake. Since Lake Cunningham's capacity is approximately 335 acre-feet, it could fill with sediment in approximately 200 years.

Groundwater: Development in the upper portions of the watershed has cut off some of the groundwater flow to existing springs and shallow wells due to installation of drainage systems. Future Urban development could effect the water supplies to the shallow systems. These shallow springs are beneficial to ranching operations and wildlife.

Development between the valley floor and the steep upper portion of the watershed will decrease recharge. These alluvial fans are the recharge area for the Santa Clara Valley Basin.

Wildlife: The projected urbanization of the watershed will result in a reduction of the oak-grassland plant community with an associated decline in wildlife diversity and density. Aquatic organisms would be adversely affected by accelerated erosion and subsequent downstream sedimentation associated with anticipated urban development. Maintenance required to remove accumulated sediment would disturb aquatic organisms and Type 3 wetlands occurring within the channels.

Impacts such as urban development, grazing, water diversion, and recreation have altered the ecological stability of these riparian ecosystems and decreased their biological diversity. Riparian communities are biologically diverse resources which have been reduced within the watershed. Local concern has emphasized the need for protection of these important ecosystems. Management objectives should emphasize not only preservation of existing communities, but also the need for ecological integrity of the riparian systems.

Recreation: Projected urbanization of the watershed will result in increased recreational demands. Recreational demand exceed supply. Needs for the area were evaluated using the California Department of Parks and Recreational Planning Outlook for District 4 which includes Santa Clara County. The needs for Santa Clara County are as follows:

	1980	1990
Camping Units	1485	2041
Picnic Tables	0	0
Boat Access Sites	2984	4117
Miles of Trail	213	405

Other Programs

The on-going programs of the county, city, state, and federal agencies are solving some of the watershed problems. Some of the problems which are being partially or totally resolved include: flooding, erosion and sedimentation, groundwater, and recreation.

Flooding: During the past 25 years, the Santa Clara Valley Water District has spent nearly $3 million installing flood control measures. Measures installed include a series of channel projects in the mid and late 1950's on Lower Silver Creek between Coyote Creek and Capital Expressway. In the early 1970's the upper Silver Creek watershed was diverted to Coyote Creek and improvements were made to Silver Creek between Capital Expressway and King Road. Thompson Creek from Lower Silver Creek through Quimby Road was also improved at the same time. During 1978-79 the SCVWD in cooperation with the City of San Jose installed Lake Cunningham which includes 380 acre-feet of flood storage. These improvements have reduced the floodable homes and residences from an estimated 10,200 to 4,400.

Erosion and sedimentation: The combined efforts of Santa Clara County, San Jose Planning Department and Evergreen Resourse Conservation District, have provided programs which control types and methods of land development, and affect erosion and sediment conditions. The source of these controls are zoning, policies, ordinances, and direct land owner assistance.

City of San Jose and Santa Clara County have formulated General Plans which control land use development and densities in urban areas. Santa Clara County's plans are currently being revised. The revised plans establish updated urban service areas for all cities and establishes other land uses for the following zoning classifications: hillsides, ranchland, agricultural, rural, residential, and baylands. The zoning established for the Lower Silver Creek Watershed consists of an urban reserve area of about 18,200 acres for the City of San Jose, and 9,500 acres of hillside and ranchland (Figure 2). The hillside and ranchland zoning restricts development to a minimum allowable size of 1 residence per 20 acres.

Growth in the undeveloped area within the urban reserve area, but outside the City of San Jose, is controlled by the Evergreen Development Policy. This policy requires that if development occurs in the existing open space (transition zone), the developer must provide an adequate outlet channel from the proposed subdivision down to Lake Cunningham. This channel must be of adequate capacity to handle the 1 percent event for the future urban conditions. Such a development is complete on

Norwood Creek and it is anticipated that Quimby, Fowler, and Evergreen Creek will be developed in the same manner. There is about 1,000 acres of prime farmland in the transition zone that is zoned for urban development. An erosin control ordinance has been drafted for Santa Clara County based on a study completed on Calabazus Creek Watershed. This ordinance will pertain to all developments in the watershed and will establish minimum standards and provide regulations for the construction and maintenance of fills, excavations, cuts, and clearing of vegetation, revegetation of cleared areas, drainage control, and protection of exposed soil surfaces.

Watershed treatment is being carried out through the on-going program of the Evergreen Resource Conservation District (ERCD). Under the land treatment program, individual landowners and users apply conservation practices with assistance from the ERCD and the Soil Conservation Service. Of the 9,500 acres of hillside and ranchland, 70 percent is adequately treated. To maintain and improve the resource base and to solve associated problems the following practices are recommended:

Practice	Unit	Amount
Proper Grazing	Ac.	7,000
Range Seeding	Ac.	300
Access Road	Ft.	2,000
Spring Development	No.	10
Trough or Tank	No.	12
Wildlife Upland Habitat Management	Ac.	80
Fencing	Ft.	12,000
Stock Trails	Ft.	8,000
Critical Area Planting	Ac.	5

These conservation practices will benefit natural water penetration, reduce erosion 30 percent, siltation 33 percent, and will generally improve hydrologic conditions. Land treatment measures established for rangeland would result in some wildlife enhancement.

Fire prevention and suppression are essential on this watershed. California Department of Forestry, assisting the county, Santa Clara Valley Water District and the City of San Jose, have good fire prevention and control programs in the watershed.

The zoning ordinances and land treatment programs provide the means of maintaining the hillside, ranchland, and controlling development by reducing the estimated average annual erosion value from a 10,690 tons to 7,110 tons.

Groundwater: The Santa Clara Valley Water District (SCVWD) has an ongoing program which provides for groundwater recharge of the county. The zoning and land treatment previously discussed, will prevent dense development in the upper watershed, which would adversely affect groundwater infiltration and recharge.

Recreation: The City of San Jose and the Santa Clara Valley Water District (SCVWD) have worked together to develop a plan to provide a recreation area and flood control storage at Lake Cunningham. The lake site was developed with financial assistance from various state and federal recreation agencies. As developed, the 200 acre recreational park has a 50 acre lake. Future installation calls for a 10 acre swim lagoon, 112 acres of green space with picnic tables and trails, a park headquarters and marina. Design capacity of this park is 5,800 people.

In conjunction with this park design, 380 acre feet of flood storage is provided.

SIGNIFICANT CONCERNS

During the assessment process, analyses of impacts on a broad range of environmental, economic, and social factors were made, and the significance of these impacts to decision making was evaluated (Table 1). The sponsors have substantial concern for solving the problem of flooding, erosion, and sedimentation. Reduced operation and maintenance costs have also been given considerable attention. Additional concerns are dictated by federal rules, regulations, and policies. Specific concerns are requirements according to the Endangered Species Act, National Historical Preservation Act, Executive Orders 11988 and 11990, (Floodplain Management, and Protection of Wetlands), and USDA Secretary's Policy Memorandum 1827 (Statement on Land Use Policy).

SCS policy clearly defines the rules and regulations by which federal assistance is provided to sponsors. The SCS environmental policy dictates that equal consideration shall be given to historic preservation, protection of wetlands, threatened and endangered species, and the retention of important farmland. The SCS-FWS Channel Modification Guidelines, National Bulletin No. 390-0-5, July 3, 1980, will be followed throughout the planning process.

As stated above, SCS advocates the retention of important farmland. The sponsors and Santa Clara County, through the updated general plan, have identified agricultural lands which they consider important and have zoned them accordingly.

The proposed watershed contains about 1,000 acres of prime farmland. The decision making process took into account these prime lands.

On July 31, 1978, the Board of Supervisors of Santa Clara County decided to establish a General Plan Advisory Committee. The committee's most important tasks are: (a) the identification of agricultural lands, and

(b) the formulation of policies and regulatory mechanisms to protect such lands. The General Plan, as previously discussed, represents the conclusions of the committee. It has designated the 1,000 acres of prime farmland as urban reserve land, and thus has committed it to urban use for the City of San Jose.

The proposed federal action will not cause or encourage the conversion of this primeland. These lands are outside the flooded area as defined by the federal insurance study and provisions have been adopted by local government to allow for their development.

Analyses of Table 1 and the on-going programs shows that the proposed project would have no significant impacts on prime agricultural lands, land use, fish, irrigation, groundwater, mineral resources, and air quality. Preliminary studies indicate a concern for the past and projected future losses of riparian corridors. Efforts to preserve or enhance these resources will be a part of the continued planning.

TABLE 1

Analysis Of Impacts for Lower Silver Creek Watershed

Economic, Environmental and Social Factors	Degree of Impact 1/	Significant to Decisionmaking 2/	Remarks
Floodwater	Major	Yes ✓	
Erosion and Sedimentation	Moderate	~~Yes~~ no	
Land Use	Moderate	Yes NO	
Prime Agricultural Land	None	No ✓	Zoned urban and being developed
Streams	Minor	Yes ✓	
Lakes and Wetlands	Moderate	Yes	With off-channel storage ←
Wildlife	Moderate	Yes ✓	
Groundwater	Minor	No	Development in recharge area will occur with or without project
Fish	Minor	No	
Water Quality	Minor	No	
Irrigation	None	No	
Visual Resource	Moderate	Yes ✓	
Endangered and Threatened Plants and Animals	None	Yes ✓	Due to SCS policy
Transportation	Major	Yes ✓	
Economic Resources	Major	Yes ✓	
Air Quality	Minor	No	
Mineral Resources	None	No	None Present
Cultural Resources of National Significance	?	Yes ✓	Due to SCS policy
Recreation	Minor	No	

1/ Degree of impact was used as a basis for achieving balance in the presentation of project impact data (See Alternative and Impact Section).

2/ Factors believed to be important to decisionmaking were used as a basis for preparing the Comparison of Alternatives (Table II).

PROJECT FORMULATION

Goals and Objectives

Two broadly-based objectives, national economic development (NED) and environmental quality (EQ), guided planning. The NED objective advocates increasing the value of the Nation's output of goods and services or improving economic efficiency. The EQ objective promotes the conservation and/or preservation of the nonmonetary aspects of man's surroundings such as cultural resources, ecological system, or quality aspects of the nonrenewable natural resource base.

The sponsors considered a broad range of resource problems and potentials before establishing planning goals under the two objectives. Significant opportunities for public involvement, as well as input from Federal, State and local agencies, were provided during the goal setting process. The following goals were identified:

Objectives	Goals
National Economic Development	Increase income through . . .
	1. Reduction of floodwater damages to 4400 properties located in floodplain.
	2. Reduction of floodwater related disruptions to the transportion (road) systems.
	3. Reduction of sediment deposition on floodplain.
	4. Reduction of streambank erosion on Lower Silver Creek.

	5. Reduction of Operation and Maintenance costs on Lower Silver Creek.
Environmental Quality	Improve environment by . . .
	1. Protecting or enhancing existing wetlands, riparian and oakgrassland communitites.
	2. Protecting or enhancing endangered or threatened plants and animals.
	3. Protecting cultural resources.
	4. Maintaining or enhancing visual resources.
	5. Maintaining or lowering sediment concentrations below existing values.

Public Participation

As part of project formulation, the SCVWD has followed a continuous public participation process. Prior to applying for Federal assistance in February 1979, the local sponsors prepared a proposed solution to the flooding problems. As part of their planning process, the sponsors issued a final environmental impact report, dated May 1978, to comply with the California Environmental Quality Act (CEQA). The process included coordination with other agencies, groups, and the public. From 1974 to 1979, eight community meetings, two community workshops, three public meetings, and a final approval hearing were held by the SCVWD. In conjunction with these meetings, a public opinion poll was conducted by a private firm to obtain public inputs and responses to the proposed project.

Results of these meetings and studies show that approximately 4,000 citizens were contacted through the neighborhood meetings, mailed questionnaires, and a telephone survey. The consensus of those participating was that Lower Silver Creek should be constructed primarily as a single purpose flood prevention project with associated landscape provisions, and that it should not include built-in recreational features.

To facilitate inputs and to assist in formulating alternatives, two prescoping type meetings were held. These meetings involved Federal, State, and local agencies, as well as the sponsors and local citizens. Inputs by this group assisted in determining goals, defining with and without project conditions, and defining broad alternatives.

Formulation of Alternatives

Project formulation began by listing measures which would help achieve or could be expected to satisfy one or more of the project goals. The measures considered were offstream storage, nonstructural floodproofing, and channel work. A preliminary analysis was then made of the impact of each measure under consideration of each of the goals. Table 2 summarizes the results of the analysis.

Table 2 - Preliminary Comparison of Goals and Impacts

Goal	Offstream Storage Floodwater Retention	Channel Work	Nonstructural Floodproofing
Increase income through reduction of flooding	+	+	+
Protect transportation routes from flooding	+	+	N
Protect streambank erosion	-	+	N
Reduce operation and maintenance cost	-	+	-
Reduce sediment deposition on floodplain	+	+	N
Protect or enhance wetlands	+	N	N
Protect or enhance existing riparian corridors	+	-	N
Protect cultural resources	N	N	N
Protect endangered and threatened plants and animals	N	N	N
Improve surface water quality	+	+	N
Maintain or enhance Visual Resource	-	-	-

(+) favorable impact (-) adverse impact (N) no impact

Inspection of the table revealed that none of the measures will have an adverse effect upon the goals of preserving wetlands, protecting cultural resources, protecting endangered and threatened plants and animals. Specific measures for satisfaction of these goals are therefore not needed.

Nonstructural Elements

A review of the nonstructural measures was made to determine which measures were consistent with SCS rules and regulations for implementing Executive Orders 11988 and 11990. The relocation of existing floodplain properties and floodplain acquisition is poorly suited to the watershed. The high cost and social impact of relocating the existing floodplain properties were too high to consider this alternative.

Floodplain acquisition is impractical because of the degree of development. Current FIA regulations are in effect, and any newly constructed property must have first floor elevations above the 1 percent floodline. Other measures which could apply to the flood zone are flood warning systems and flood proofing of buildings. These measures may be included in the final plan to prevent the remaining damages in the lower channel area.

Structural Elements

A number of potential upstream floodwater sites were analyzed to determine how project flood prevention needs could best be met. Investigations revealed that topography and seismic activity were limiting factors on locating potential storage sites. No traditional floodwater retarding sites were identified in the upper watershed which were cost effective. Consequently, upstream storage was dropped from further consideration, however, a potential off-channel site was investigated. See pages 31 and 32.

Lake Cunningham was investigated to determine if additional floodwater storage could be added by modifying the proposed recreational plan or by further excavation. Studies revealed that the planned recreational development was not compatible with fluctuating water levels. Further excavation would require the purchase of additional land which would offer results similar to off-channel storage.

Fish and Wildlife - Recreation

Fish and wildlife habitat could be enhanced by using the off-channel floodwater retarding structure, and the development plan outlined in Appendix A. An additional storage area of about 200 acre-feet of permanent water would be provided. This could be accomplished by excavating approximately 330,000 cubic yards of earth for an estimated cost of $850,000. The downstream riparian zone along Thompson Creek could be used in association with this site.

This site could help satisfy part of the need by providing jogging, hiking, and bicycle trails along the Thompson Creek and Silver Creek channel. The viability of this component is low for two reasons:

(1) Lack of sponsorship to provide the needed local share of cost.

(2) Off-site storage was not selected because of excessive land rights cost.

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ALTERNATIVES AND IMPACTS

The major objective at this stage of project formulation is to develop alternatives which are pure in nature rather than combining various elements. This type of alternative provides the most conservative economic evaluation for determining benefits. Continuing plan formulation will combine various elements that would minimize or mitigate each others negative features, while at the same time achieving project goals.

No Project

The no project condition would result in continued flooding, and associated sedimentation and debris deposition. The future without project condition indicates that the complete urban reserve area would become an urban zone with developments (and development densities) being controlled by the current zoning regulations. The hillside and ranchland would be developed to 1 residence per 20 acres. It is projected that the channel below Lake Cunningham would remain in its existing condition, however, all channels above the lake would be improved to the one percent chance flood event. Lake Cunningham would be operated with 380 acre-feet of flood storage. Developed conditions would provide additional runoff of 660 cfs at Cunningham Lake.

If the no project condition were to exist, then a one percent flood would cause excessive damage to the city of San Jose with average annual damages of about 1,344,000. It is estimated that 1,600 residences, 110 businesses, and 20 industries would suffer significant damage. Thus, there would be a high cost involved for repair and clean-up. In the present floodplain, current Federal Insurance Administration (FIA) floodplain regulations have been adopted. Future flooding would involve an area greater than that shown on the existing Flood map, because of the development in the upper watershed.

Nonstructural Floodplain Protection - Alternative A

This alternative includes the installation of nonstructural flood protection measures in the floodplain area. The flood protection measures include the installation of a flood warning system and floodproofing individual properties.

The floodwarning system includes a system of gauges on Thompson Creek and Lake Cunningham, and a warning system to alert local residents of impending dangers due to flooding.

Floodproofing individual properties would involve the construction of 12,500 feet of ring dike around 36 properties, elevating 3 residences, and installing 287,000 feet of protective walls around 1,687 properties. In conjunction with all of the floodproofing measures, it would be necessary to install one-way valves on storm drains, and to block off low-level entrances and windows in buildings.

Operation and maintenance of this alternative would involve a program of education, inspection, upkeep, and replacement of the protective measures, plus, the on-going maintenance of the Silver Creek Channel.

The estimated total installation cost is $13,680,000.

Off Channel Flood Structure - Alternative B (Figure 3)

This alternative consists of an off-channel flood retarding structure to be located between Fowler and Aborn Road just north of San Felipe Road. It would involve about 70 surface acres at design high water and would provide 1,570 acre-feet of floodwater retention and 278 acre-feet of sediment storage. The structure would be designed for the one percent event. This needed storage would be provided by an excavation of about 1,140,000 cubic yards of material, and the construction of a compacted earthfill dam, which would be 35 feet high and would contain about 566,000 cubic yards of material. A concrete structure would

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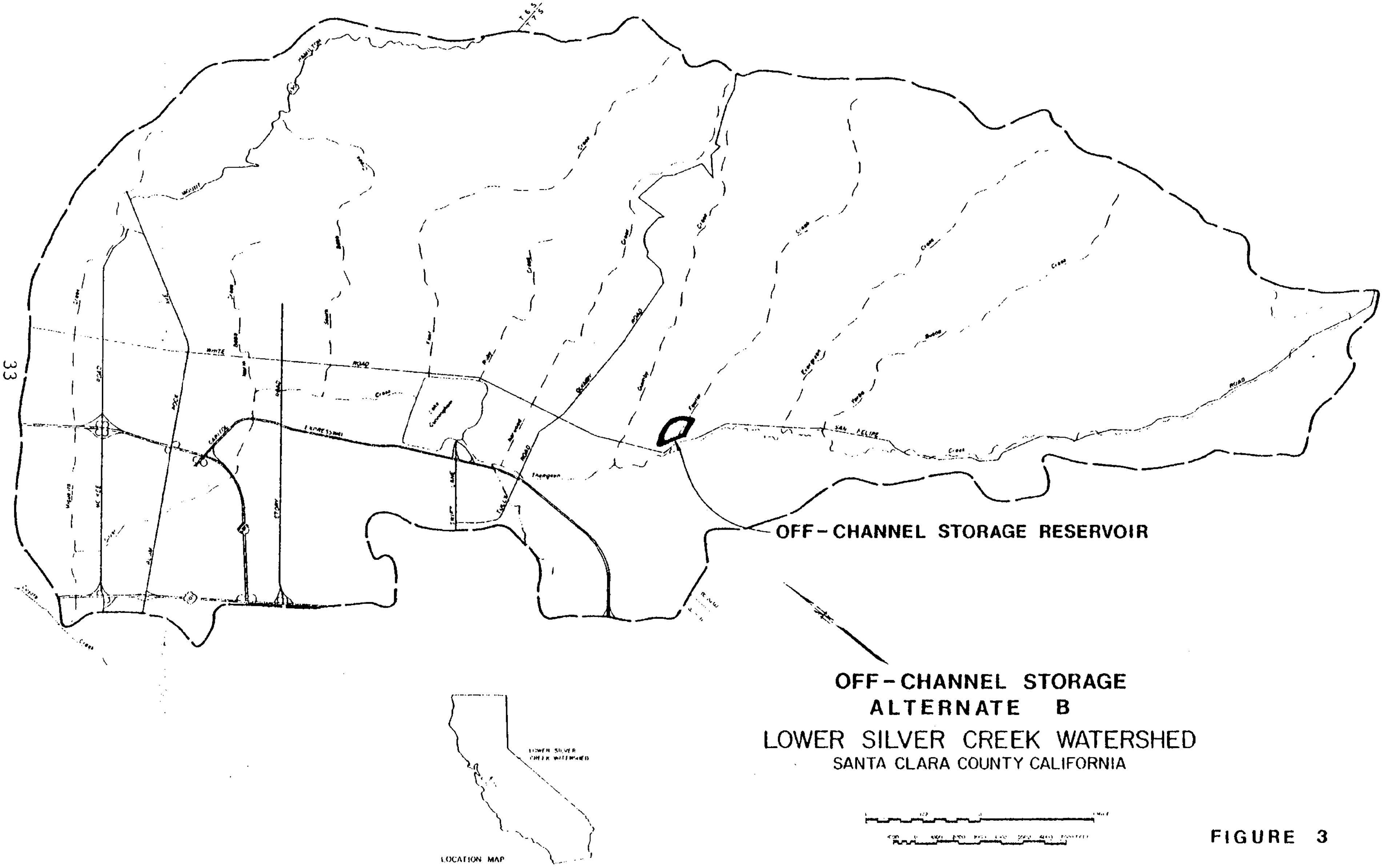


OFF-CHANNEL STORAGE
ALTERNATE B
LOWER SILVER CREEK WATERSHED
SANTA CLARA COUNTY CALIFORNIA

FIGURE 3

divert flows from Thompson Creek above 150 cubic feet per second into the reservoir through 1,100 feet of diversion channel. The reservoir would be emptied in 4 days through a principal spillway which would discharge into Thompson Creek.

Erosion control planting would be established and landscape plantings would include native species. These plantings would improve the appearance of the structure (see Appendix A) and would provide wildlife habitat. The structure would have special design features which would insure seismic safety.

The proposed improvements would require 120 acres for installation of the reservoir, dam, concrete spillway, and inlet channels.

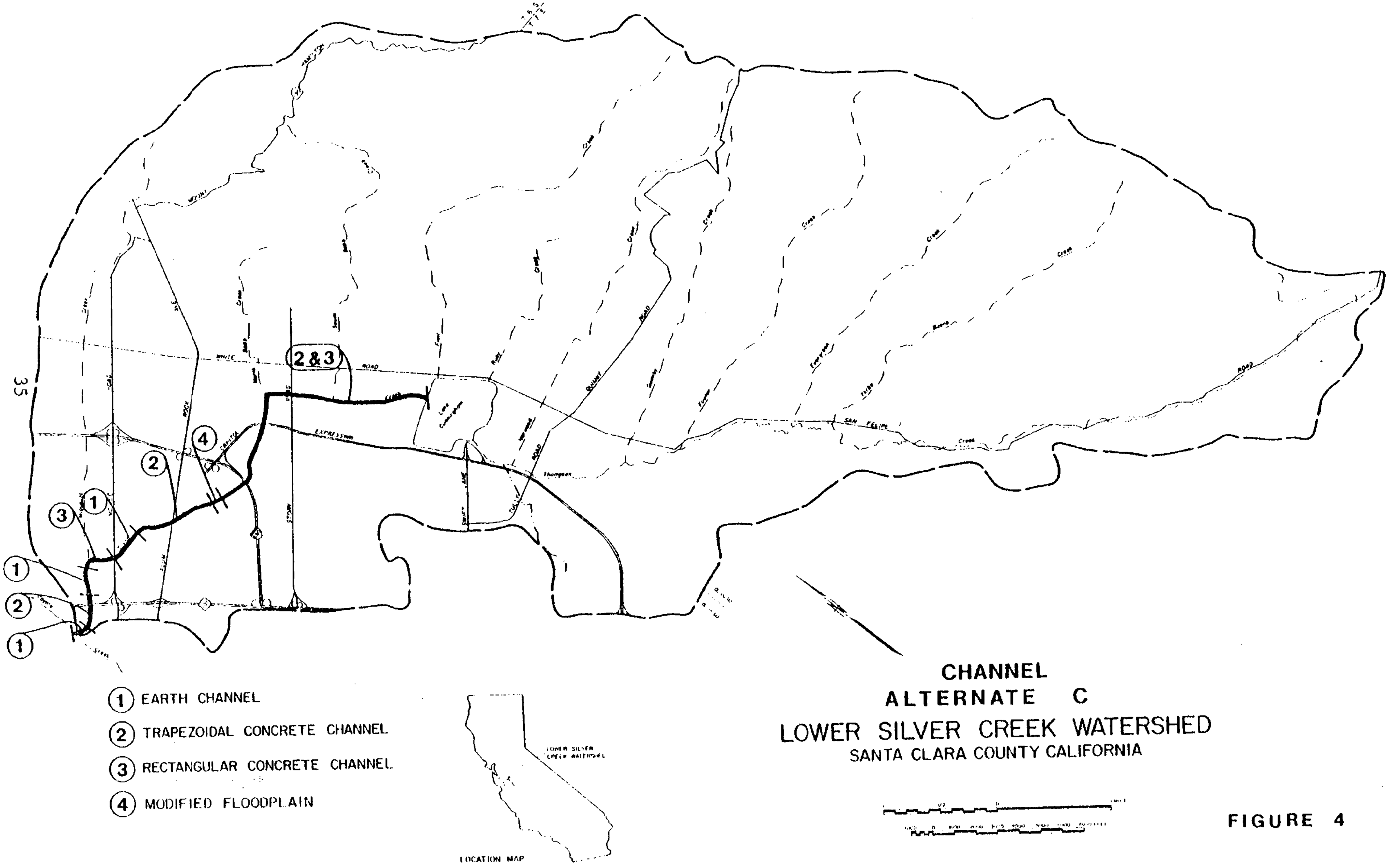
The estimated total installation cost is $15,878,000.

Channel Work - Alternative C (Figure 4)

This alternative consists of installing a channel system from the junction of Coyote Creek upstream to Lake Cunningham. The plan involves 3,500 feet of earth channel, 500 feet of modified floodplain, and 18,700 feet of concrete lined channel. The channel would handle flows resulting from the one percent chance event.

The channel bottom widths would vary from 15 feet to 40 feet. The proposed right-of-way needs would vary in width from 58 to 150 feet. All sections of the channel would enclosed with a low contrast fence to minimize visual contrast.

Along the entire channel, plantings would be provided near the tops of the channel banks. Where possible, the slopes of the earth channel would be planted with a low growing ground cover requiring little maintenance after establishment.



CHANNEL
ALTERNATE C
LOWER SILVER CREEK WATERSHED
SANTA CLARA COUNTY CALIFORNIA

FIGURE 4

Work on Lower Silver Creek, above Lake Cunningham, has been completed by the Santa Clara Valley Water District (SCVWD). In addition the SCVWD has constructed levee's on Thompson Creek resulting in a modified floodplain.

The estimated total installation cost is $14,290,000.

TABLE 3
COMPARISON OF ALTERNATIVES

Project Features/Impacts	Goals and Constraints	No Project	Alternate A Nonstructural measures in floodplain	Alternate B off-channel flood storage	Alternate C 4.3 Miles of channel work
Average Annual Cost PL-566	N/A	-----	797,000	711,000	1,039,000
Local Costs	N/A	-----	199,000	421,000	27,000
Annual O&M Cost	N/A	48,500	269,000	71,000	16,000
Total Annual Cost	N/A	48,500	1,265,000	1,203,000	1,082,000
Annual Benefits	N/A	-----	1,249,000	806,000	1,206,000
Damage Reduction (%)	100	0	93	60	90
Flood Reduction	Adequately protect all properties from floodwater.	1,700 buildings flooded, 3,700 yards flooded.	No buildings flooded. Flooding to continue on 3,700 yards.	900 buildings flooded. Flooding to continue on 3,500 yards.	400 buildings flooded. Flooding to continue on 643 yards.
Erosion	Reduce streambank erosion, lower Silver Creek.	No Impact	No Impact	No Impact	Stable Channel
Sediment	Reduce sediment deposition on floodplain.	8,600 tons of sediment deposited on floodplain in an average year.	8,600 tons of sediment deposited on floodplain in an average year.	5,700 tons of sediment deposited on floodplain in an average year.	No sediment deposited on floodplain.
Transportation	Maintain transportation during flood event.	Continued flooding of major routes.	Continued flooding of major routes.	Route 101 and Capitol Expressway closed. 50 year flood or greater.	Route 101 closed by 100 year flood.
Wildlife	Protect riparian and oak-grassland habitat.	No Impact	No Impact	Establish 120 acres of habitat in Reservoir area.	Plantings of 13 acres along channel.
Wetlands	Preserve or enhance wetland habitat.	No Impact	No Impact	Add 44 acres.	Modified channel bottom.
Visual	Minimize adverse affects.	No Impact	Protective wells and dikes around properties.	35 foot high dam along San Felipe Road.	18,700 feet concrete channel 3,500 feet of earth channel, 500 feet modified floodplain. (See Figures 6 and 7)
Endangered or threatened flora or fauna	Avoid damage.	No Impact	No Impact	No Impact	No Impact
Cultural resources of national significance	Avoid damage.	No Impact	No Impact	No Impact	No Impact
Prime Lands	Preserve prime farm land.	No Impact	No Impact	No Impact	No Impact
Water Quality	Maintain or lower sediment concentration from existing Average Annual value of 13,000 parts per million (p.p.m.)	4,200 p.p.m. sediment leaving watershed.	4,200 p.p.m. leaving watershed.	5,200 p.p.m. leaving watershed.	9,200 p.p.m. leaving watershed.

SPONSORS PREFERRED PLAN

To solve the flood problems of the Lower Silver Creek Watershed the sponsors prefer the solution as presented in Alternative C. In association with the proposed channel work the sponsors endorse and promote the on-going programs of land use zoning, erosion control ordinances, and land treatment.

Discussions with the sponsors indicate that they would consider the inclusion of some nonstructural measures in the final selected plan. Additional plan formulation of the NED plan will determine if any such increments are justified.

Proposed Channel: Work would begin at the confluence of Lower Silver Creek with Coyote Creek and end at the outlet of Lake Cunningham. The alignment would follow the existing creek, and most of the work would be within the right-of-way presently owned by the Santa Clara Valley Water District.

The following presents the proposed work and reason for selecting this type of channel:

No.	Reach Description 1/	Length Feet	Proposed Section 2/	Reason
1	Coyote Creek to Wooster Avenue	650	Earth Channel	Adequate right-of-way to accomodate earth channel, non-erosive velocities, allows return to natural creek environment.
2	Wooster Avenue to 550' upstream of N. Marburg Way	1,550	Trapezoidal Concrete Channel	Limited right-of-way widths, several short reaches between adequate bridges with highly eroded banks.

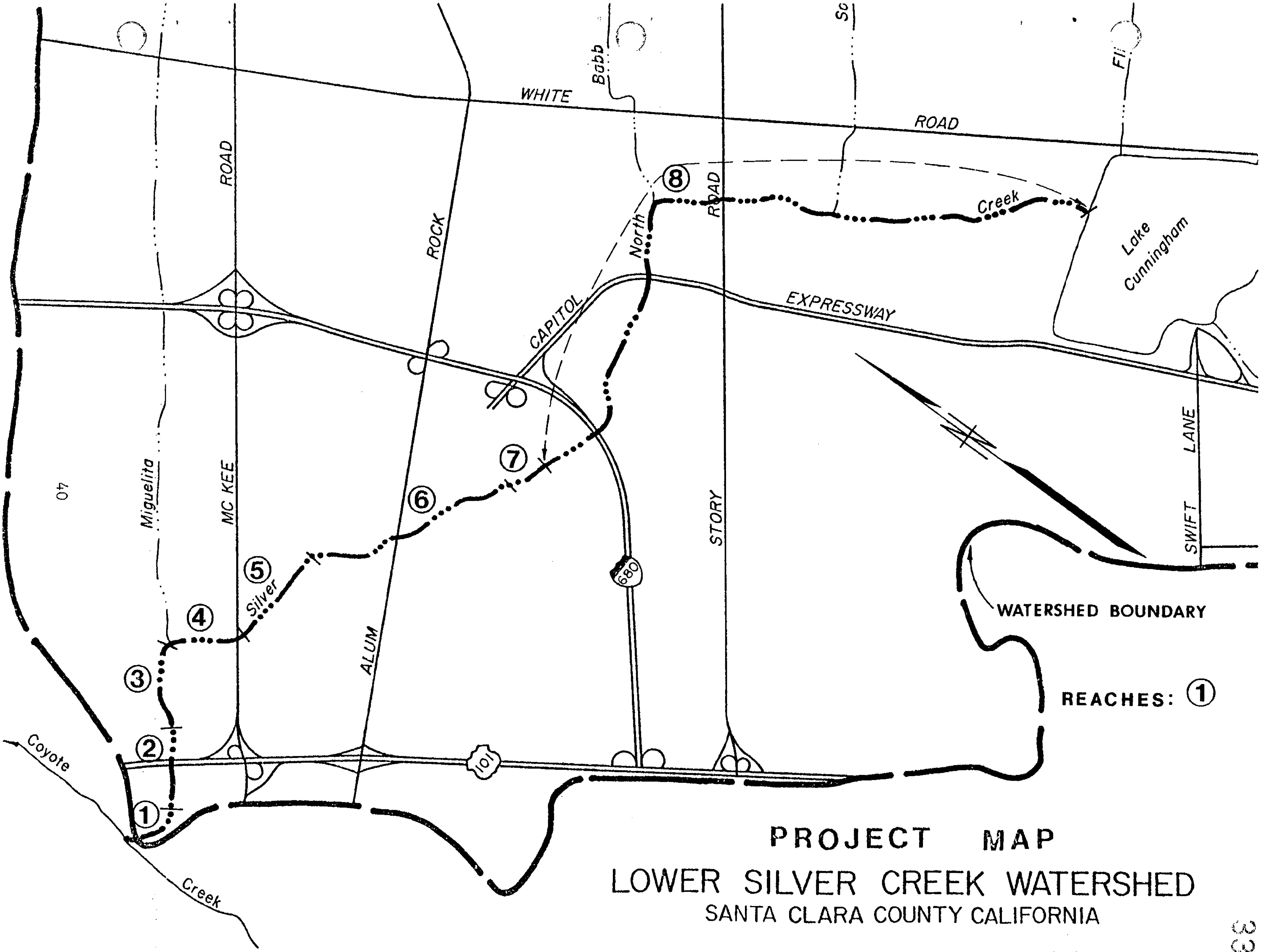
1/ See Figure 5.

2/ Typical crossection shown in Figure 6 and 7.

3	550' upstream of N. Marburg Way to King Road	1,220	Earth Channel	Adequate right-of-way available to accommodate earth channel, nonerosive velocities, allows return to natural creek environment.
4	King Road to McKee Road	1,360	Rectangular Concrete Channel	Limited right-of-way width available.
5	McKee Road to Tropicaire Drive-In	1,590	Earth Channel	Adequate right-of-way width available, nonerosive velocities, allows return to natural creek environment.
6	Tropicaire Drive-In to Mayfair Park	3,940	Trapezoidal Concrete	Limited right-of-way width available, some existing adequate concrete lining, erosive velocities.
7	Mayfair Park	490	Modified Floodplain	Incorporates the park into the creek.
8	Mayfair Park to Cunningham Lake	12,950	Trapezoidal and Rectangular Concrete Channel	Limited right-of-way widths available, erosive velocities.

Along the entire length of the channel, plantings will be made on the banks and right-of-way. Where possible, low growing ground cover would be planted on the slopes of the earth channel. The vegetated areas along the tops of the banks vary from 2 to 35 feet. The plantings would consist primarily of ground cover and species of trees native to the area. Wildlife habitat features and planting species will be incorporated into the design where feasible.

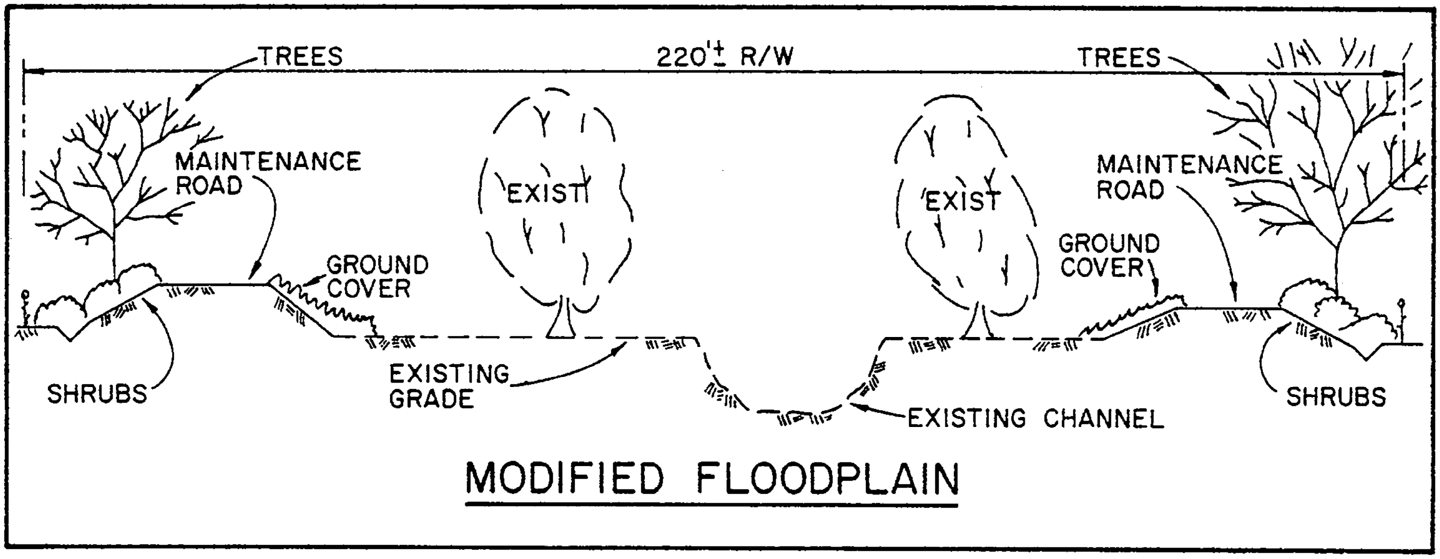
The maintenance activities that are required would include: silt removal, weed and brush management, rodent control, fence repair, and the installation of regulatory signs.



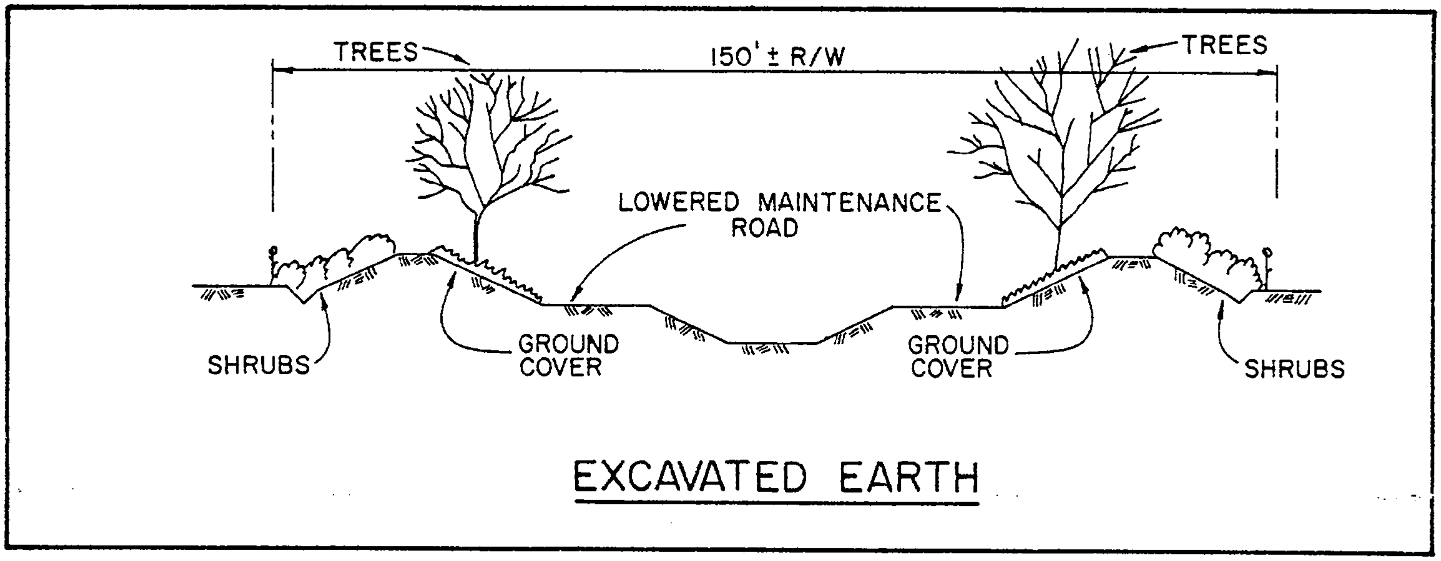
PROJECT MAP
LOWER SILVER CREEK WATERSHED
SANTA CLARA COUNTY CALIFORNIA

FIGURE 5

TYPICAL EARTH CHANNELS



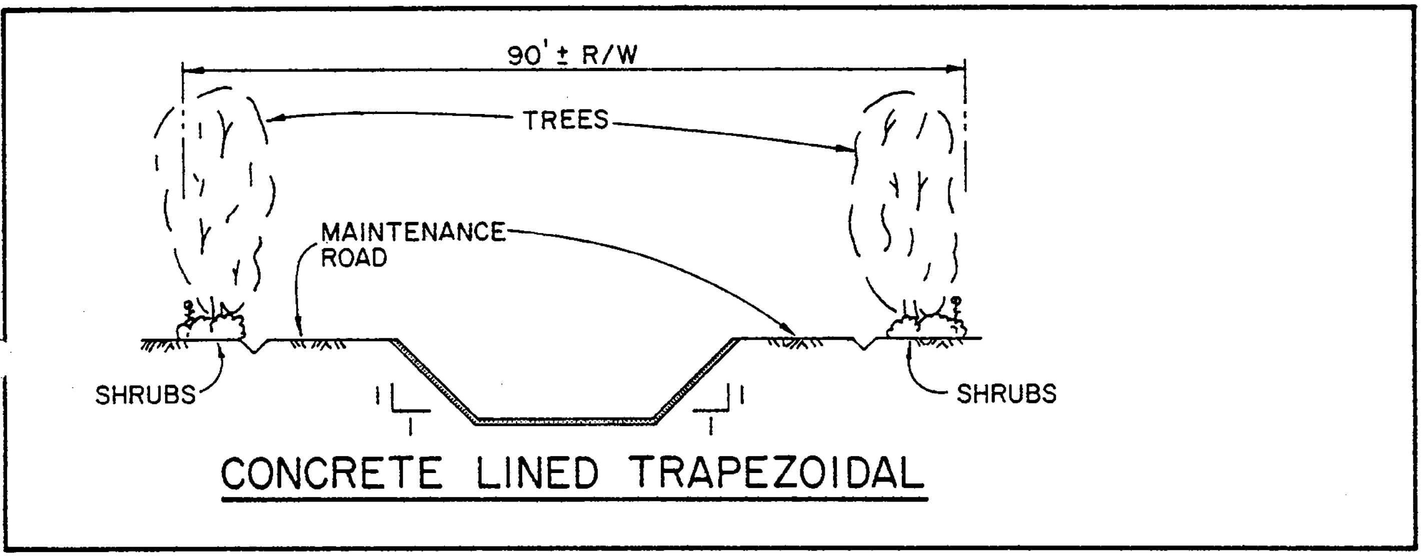
MODIFIED FLOODPLAIN



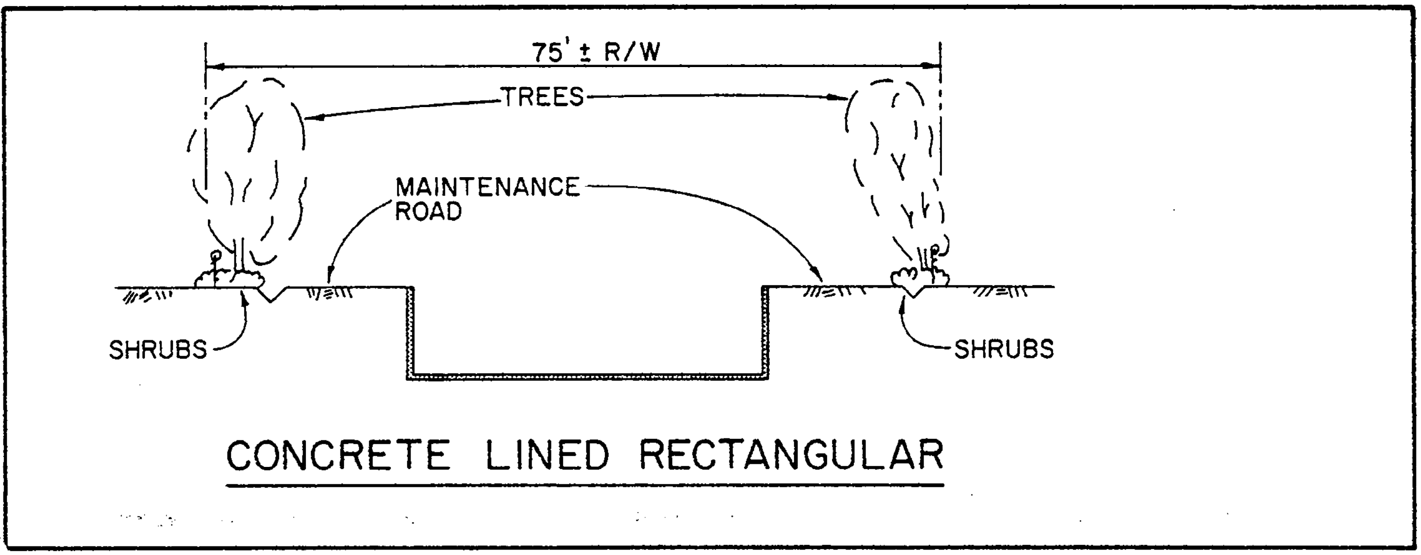
EXCAVATED EARTH

FIGURE 6

TYPICAL LINED CHANNELS



CONCRETE LINED TRAPEZOIDAL



CONCRETE LINED RECTANGULAR

FIGURE 7

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RESPONSIBILITIES AND COST SHARING

Public Law 566 projects are carried out by sponsoring local organizations with federal assistance. Federal assistance includes both technical and financial assistance. For the measures described in this report, PL-566 funds can pay the following costs:

--All construction costs allocated to flood prevention. Mitigation costs are included in this category.

--Up to half of construction cost allocated to wildlife and recreational development.

--All engineering costs for surveys, designs, and construction inspections.

--Soil Conservation Service (SCS) administrative costs.

The local sponsors are responsible for the following cost items:

--All land rights costs for flood prevention, including those for land stabilization and mitigation measures. Land rights costs include any costs for building new bridges and culverts, replacing existing ones, rebuilding roads and modifying utilities.

--At least half of construction costs allocated to wildlife or recreational development.

--Local administrative costs.

If any persons, businesses, or farm operations are displaced by the project, relocation payments to them must be made. Such costs are shared by the SCS and sponsors at the same ratio as the total project costs.

In carrying out the project, the sponsors' major responsibilities include:

--Acquiring all land rights, by eminent domain if necessary.

--Acquiring any water rights needed.

--Obtaining all permits that are required to carry out the project.

--Providing relocation advisory services to any persons, businesses, or farm operators that are displaced by the project.

--Administering construction contracts or asking the SCS to do so.

--Operating and maintaining the completed structures.

Local sponsors are willing and able to implement an acceptable watershed plan. The Santa Clara Water District, which has the power of eminent domain, will be responsible for acquiring all necessary land rights for installation of the flood prevention plan. The proposed watershed project is to be financed from current ad valorem taxes in the East Zone of the District, and from cost sharing agreements with the City of San Jose and the State of California. Loans from the District's General Fund could be used to supplement other sources of funding.

APPENDIX A

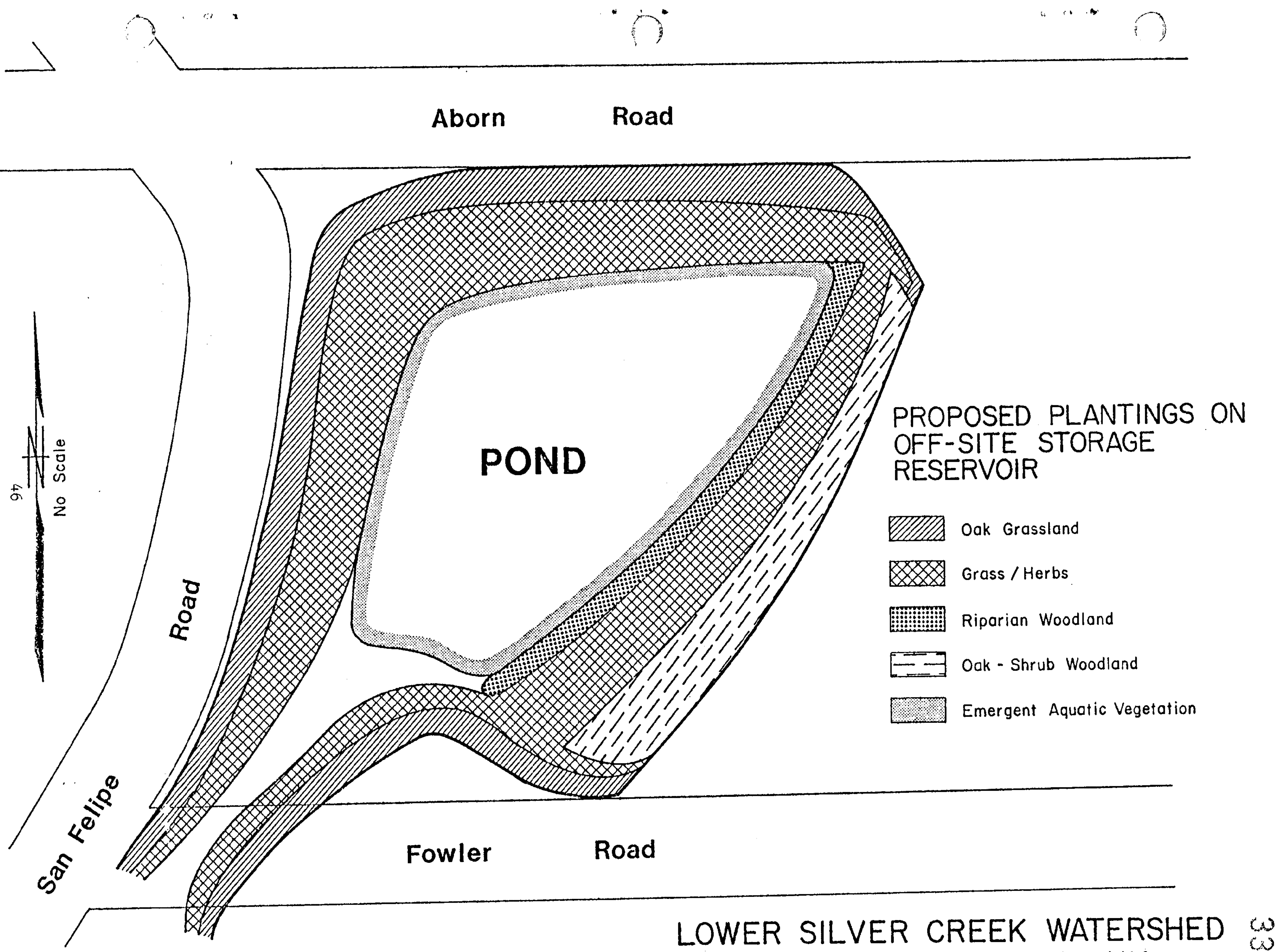
APPENDIX A

ESTABLISHMENT OF NATIVE PLANT COMMUNITIES ON THE OFF-SITE STORAGE RESERVOIR

Plant species selection for erosion control on the off-site storage reservoir would emphasize locally adapted native plants beneficial to wildlife. Plantings would simulate natural plant communities that are of regional significance and beneficial to wildlife. The plant communities which would be established are displayed on the following map.

The dominant plant communities and their approximate acreage would be as follows: oak-shrubland - 9 acres; oak-grassland - 6 acres; riparian woodland - 1 acre; grassland-herbs - 44 acres; and aquatic (including shoreline emergent vegetation) - 44 acres. The pond would eventually fill in with sediments resulting in a gradual succession from open pond to marsh.

This area would be fenced off and only limited access would be allowed. This would insure the integrity of the plant communities and their associated wildlife. The area could be utilized by schools and other groups as an outdoor classroom.



PROPOSED PLANTINGS ON OFF-SITE STORAGE RESERVOIR

LOWER SILVER CREEK WATERSHED
SANTA CLARA CO., CALIFORNIA